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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,391	01/15/2004	You-seop Lee	249/436	4946

7590 04/13/2006

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EXAMINER	
MRUK, GEOFFREY S	
ART UNIT	**PAPER NUMBER**
2853	

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/757,391	LEE ET AL.	
	Examiner	Art Unit	
	Geoffrey Mruk	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *11-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/15/04, 6/24/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of Group I, claims 1-10 in the reply filed on 22 February 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukushima (US 6,336,697 B1).

With respect to claim 1, Fukushima discloses a method of ejecting ink (Column 5, lines 36-39) comprising:

(a) filling a rear end of a nozzle (Fig. 7, element 11) with ink using a capillary force, the rear end of the nozzle being surrounded by a hydrophilic layer (Fig. 7, element 150);

(b) forming an electric field directed toward an outlet of the nozzle on a front end of the nozzle (Fig. 7, element 131), the front end of the nozzle being surrounded by a hydrophobic layer (Fig. 8, t_0);

(c) varying a surface tension of ink to separate ink droplets having a predetermined volume from ink and to move the separated ink droplets within the front end of the nozzle toward the outlet of the nozzle (Fig. 8, t_1-t_2; Column 16, lines 33-55); and

(d) ejecting the separated ink droplets through the outlet of the nozzle (Column 16, lines 56-62).

With respect to claim 2, Fukushima discloses forming an electric field (Column 16, lines 27-28) directed toward the outlet of the nozzle (Fig. 6, element 11) comprises: sequentially applying a voltage (Fig. 6, elements 141-14n) to a plurality of electrode pads (Fig. 7, elements 201, 202), the plurality of electrode pads being disposed on the front end of the nozzle at predetermined intervals in a lengthwise direction of the nozzle (Column 16, lines 6-26).

Fukushima discloses:

- the degree of affinity for the liquid to be jetted varies along the direction of the flow path through the nozzle (Column 15, lines 11-30; Fig. 6, elements 141-14n; Claim 49) and

- the degree of affinity for the liquid to be jetted can be varied in response to changes in a physical quantity comprising one or more of heat, electric field strength, and magnetic field strength (Column 16, lines 16-32; Claim 62).

Therefore, Fukushima meets the claimed limitations since the affinity regions (Fig. 6, elements 141-14n) and the electrodes (Fig.7, elements 201, 202) are functional equivalents.

With respect to claim 3, Fukushima discloses varying the surface tension of ink comprises: lowering the surface tension of ink adjacent to one of the plurality of electrode pads (Fig.7, elements 201, 202) to which the voltage (Fig.7, element 203) is applied so that a contact angle of ink with respect to the hydrophobic layer is reduced (Claim 59).

With respect to claim 4, Fukushima discloses wherein forming the electric field and varying the surface tension of ink (Fig. 8, t_1-t_2) comprises: sequentially applying a voltage (Fig. 7, element 203) to a first electrode pad and a second electrode pad of the plurality of electrode pads (Fig. 7, elements 201, 202) to move ink within the front end of the nozzle to a position corresponding to a location of the second electrode pad; and cutting off the voltage (Fig.7, element 203, Fig. 8, t_3) applied to the first electrode pad to separate the ink droplets from ink (Column 16, lines 56-62; Claim 59).

With respect to claim 5, Fukushima discloses after the separation of the ink droplets from ink, (c) further comprises: cutting off the voltage (Fig.7, element 203, Fig. 8, t_3) applied to the second electrode pad and sequentially applying a voltage to at least one electrode pad of the plurality of electrode pads disposed after the second electrode

pad to move the separated ink droplets toward the outlet of the nozzle (Column 16, lines 33-62).

With respect to claim 6, Fukushima discloses an area of each of the plurality of electrode pads is variable so that a volume of the ink droplets is adjustable (Column 15, lines 39-42).

With respect to claim 7, Fukushima discloses a moving speed of the separated ink droplets in the front end of the nozzle is adjusted by a time difference during the sequential application of the voltage to the plurality of electrode pads (Column 15, lines 39-42).

With respect to claim 8, Fukushima discloses wherein (d) further comprises: cutting off the voltage (Fig.7, element 203, Fig. 8, t_3) applied to an electrode pad where the ink droplets are located, prior to ejecting the separated ink droplets (Column 16, lines 33-55).

With respect to claim 9, Fukushima discloses wherein in (d), the ejection of the separated ink droplets is performed by an electrostatic force (Claim 62).

With respect to claim 10, Fukushima discloses wherein in (d), the ejection of the separated ink droplets is performed by lowering an atmospheric pressure (Fig. 7, element 120) around the outlet of the nozzle (Fig. 7, element 11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM
4/11/2006

GM

STEPHEN MEIER
SUPERVISORY PATENT EXAMINER